EN TRANSM

PTO/S8/08A (08-03)
Approved for use through 07/31/2006, OMB 0851-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 5

١	Complete if Known						
Ì	Application Number	10/696,528					
ſ	Filing Date	28 October 2003	•				
ſ	First Named Inventor	Ulrich VOLLATH					
I	Art Unit	2655					
I	Examiner Name						
1	Altomay Docket Number	A-1403					

			U. S. PATEN	DOCUMENTS	
Examiner Initials*	Cite No.1	Document Number Number-Kind Code ^{2 (F Interno)}	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
FILM		^{US-} 5,519,620	05-21-1996	Talbot et al.	
FMM		^{US-} 5,602,741	02-11-1997	Talbot et al.	
FHM		us 5,757,646	05-26-1998	Talbot et al.	<u> </u>
FAM		^{US-} 5,890,091	03-30-1999	Talbot et al.	
FHM		US- 5,828,336 US-	10-27-1998	Yunck et al.	
		US-		 	<u> </u>
		US-	'		
		US-			
		U\$-			•
-		US-			
		US-			
		U\$-			
		US			
		US		· · · · · · · · · · · · · · · · · · ·	

	214	10115	IGN PATENT DOCU			
Examiner Initiats*	Cite No.1	Foreign Patent Document	Publication Date	Name of Patentee or Applicant of Cited Document	Pages, Columns, Unes, Where Relevant Passages	Γ
		Country Code ³ Number ⁴ Nand Code ³ (if known)	MM-DD-YYYY		Or Relevant Figures Appear	ľ
						Г
						Γ
		-				Ī
		· · · · · · · · · · · · · · · · · · ·				Γ
					<u> </u>	₽

Examiner Signature	FHM	Date Considered	3-7-2007

*EXAMINER: Initial if reference considered, whether or not distion is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. *Applicant's unique citation designation number (eptional). *See Kinds Codes of USPTO Patent Documents at www.usnto.gov or MPEP 901.04. *Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). *For Japanese patent documents, the Indication of the year of the reign of the Emperor must precede the serted number of the patent document. *Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.18 if possible. *Applicant is to place a check mark here if English language

Translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.88. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and salect option 2.

PTO/S8/088 (08-03)
Approved for use through 07/31/2008, OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

U	nder the Paperwork	Reduction A	ct of 1995, no persons a	re required to respond to a collection	of information unless it contains a valid OMB	control number.
Substit	ute for form 1449/P1	ro ·	•		Complete if Known	
				Application Number	10/696,528	
			CLOSURE	Filing Date	28 October 2003	
ST	ATEMENT	BY A	PPLICANT	First Named Inventor	Ulrich VOLLATH	
	(Use as many			Art Unit	2655	·
	(Uso as many	anocia as n	ecessary)	Examiner Name		-
Sheet	2	of	5	Attorney Docket Number	A-1403	

		NON PATENT LITERATURE DOCUMENTS	
Examiner Initials*	Cite No.1	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T²
FHM	·	G. Bierman, Factorization Methods for Discrete Sequential Estimation, Academic Press, 1977 (pages 1-241)	
Fur		N. Carlson, Federated Square Root Filter for Decentralized Parallel Processing, IEEE Transactions on Aerospace and Electronic Systems, Vol.AES-26, No.3, May 1990, pp. 517-525	
CHM		S. Cliatt, GPS Modernization, Proceedings of the GNSS 2003, April 22-25 2003, Graz Austria (15 pages)	
FHM		K. de Jong, Integrated GPS/Galileo ambiguity resolution, Proceedings of NaviTec 2001. 1st ESA workshop on satellite navigation user equipment technologies, December 2001, pp. 318-325 (8 pages)	
FHM		K. de Jong, Future GPS and Galileo signals, Geo-Informatics, September 2002, 2 pp.	
(m)		P. de Jonge, The LAMBDA method for integer ambiguity estimation: implementation aspects, LGR-Series No. 12, Delft Geodetic Computing Center, Delft University of Technology, The Netherlands, August 1995, 49 pp.	
Frin Frin		P. de Jonge, Computational aspects of the LAMBDA method for GPS ambiguity resolution, Proceedings ION GPS-96, 9th International Technical Meeting of the Satellite Division of the Institute of Navigation, Kansas City, Missouri, Sept. 17-20, pp. 935-944	
Fun		HJ. Euler et al., Fast GPS ambiguity resolution on-the-fly for real-time applications, Proceedings of Sixth International Geodetic Symposium on Satellite Positioning, Columbus, OH, March 17-20, pp. 650-659	
FHM		A. Gelb (ed.), Applied Optimal Estimation, The M.I.T. Press, 1992. pp. 107-113 and pp. 133-136	
FHM		E. Grafarend et al., Generating Classes of Equivalent Linear Models by Nuisance Parameter Elimination- Applications to GPS Observations, Manuscripta Geodetica 11 (1986), pp. 262-271	

	Date	
Signature C	Considered	

^{*}EXAMINER: Initial if reference considered, whether or not distilon is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

considered. Include copy of this form with next communication to applicant.

1 Applicant's unique citation designation number (optional). 2 Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiatity is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is astimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO:

PTO/SB/08B (08-03)
Approved for use through 07/31/2006, OMB 0851-0031
Fredemark Office; U.S. DEPARTMENT OF COMMERCE

U	nder the Paperwork Rec	tuction A	ct of 1995, no persons as		of Information unless it contains a valid OM	
Substit	ute for form 1449/PTO				Complete if Known	
				Application Number	10/696,528	
INF	ORMATION	DIS	CLOSURE	Filing Date	28 October 2003	
STA	ATEMENT E	BY A	PPLICANT	First Named Inventor	Ulrich VOLLATH	
	STATEMENT BY APPLICAL (Use as many sheets as necessary)		Art Unit	2655		
	(Use as many sh	reus as n	ocessary)	Examiner Name		
Sheet	3	01	5	Attorney Docket Number	A-1403	

		NON PATENT LITERATURE DOCUMENTS	
Examiner Initials*	Cite No.1	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T².
FHM		M. Grewal et al., Kalman filtering: theory and practice using MATLAB, second edition, 2001, John Wiley & Sons, New York (401 pages)	
FAM		R. Hatch, The synergism of GPS code and carrier phase ambiguities, Proceedings of the 3rd International Geodelic Symposium on Satellite Doppler Positioning, Las Cruces, New Mexico, February 1982, Vol. 2, pp 1213-1232	
Fun		R. Hatch, Ambiguity resolution in the fast lane. Proceedings of ION GPS-89, Colorado Springs, CO, September 27-29, pp. 45-50	
		R. Hatch, Instantaneous ambiguity resolution, IAG Symposium No. 107 'Kinematic Systems in Geodesy, Surveying, and Remote Sensing', Banff, Canada, September 10-13 (KIS'90), Springer Verlag, pp. 299-308	
FHM		R. Hatch, Comparison of several AROF kinematic techniques, Proceedings of ION GPS-94, Salt Lake City, UT, September 20-23, pp. 363-370	
FHM		R. Hatch, The Promise of a Third Frequency, GPS World, May 1996, pp. 55-58	
Fren		R. Hatch, GPS Carrier-Phase Ambiguity Resolution, Institute for Mathematics and its Applications (IMA) "HOT TOPICS" Workshop: Mathematical Challenges in Global Positioning Systems (GPS), August 16-18, 2000, 57 pp.	
		G. Hein et al., Galileo Frequency & Signal Design, GPS World, June 2003, pp. 30-37.	
FHM		B. Hofmann-Wellenhof et al., GPS Theory and Practice, Springer-Verlag, Fifth Edition, 2001, pp. 213-248	
Exem		P. Joosten et al., GNSS Three Carrier Phase Ambiguity Resolution using the LAMBDA-method, Proceedings of the GNSS 1999 (6 pages)	

	· · · · · · · · · · · · · · · · · · ·		
Examiner		Date	
Signature		Considered	

[&]quot;EXAMINER: Initial if reference considered, whether or not diction is in conformance with MPEP 609. Draw line through diction if not in conformance and not considered. Include copy of this form with next communication to applicant.

1 Applicant's unique citation designation number (optional). 2 Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governeed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

PTC/SB/08B (08-03)
Approved for use through 07/31/2005, OMB 0851-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

	der the Paperwork Re- te for form 1449/PTO	duction A	ct of 1995, no persons a	ere required to respond to a collection of information unless it contains a valid OMB control number. Complete if Known			
	'			Application Number	10/696,528		
			SCLOSURE	Filing Date	28 October 2003		
STA	STATEMENT BY APPLICANT			First Named Inventor	Ulrich VOLLATH		
	(Use as many sh	aate oe i	nacaseand	Art Unit	2655		
				Examiner Name			
Sheet	4	of	5	Attorney Docket Number	A-1403		

		NON PATENT LITERATURE DOCUMENTS	
Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T²
Fun		H. Landau et al., On-the-fly ambiguity resolution for precise differential positioning, Proceedings of ION GPS-92, Albuquerque, NM, September 16-18, pp. 607-613	
FHM		A. Leick, GPS Satellite Surveying, Second Edition, John Wiley & Sons, Inc., 1995 (560 pages)	
FHM		P. Misra et al., Global Positioning System: Signals, Measurements, and Performance, Ganja-Jamuna Press, 2001, Chapter 6, pp. 209-254	
(mr		D. Odijk, Triple-Frequency lonosphere-Free Phase Combinations for Ambiguity Resolution, Proc. of the ENC-GNSS 2002 proceedings; The European Navigation Conference, Copenhagen, Denmark, 27-30 May 2002, 10 pp.	
Fren		L. Sjöberg, The best linear combinations of L1 and L2 frequency observables in the application of Transit/Doppler and GPS, Manuscripta Geodetica 15, 1990, pp. 17-22	
Fron Fron		P. Teunissen, The least-squares ambiguity decorrelation adjustment: a method for fast GPS integer ambiguity estimation, Journal of Geodesy, 1-2, 1995, pp. 65-82	
SHIN		P. Teunissen et al., Integer least-squares estimation of the GPS phase ambiguities,. Proceedings of International Symposium on Kinematic Systems in Geodesy, Geomatics and Navigation KIS'94, Banff, Canada, August 30 - September 2, Department of Geomatics Engineering, The University of Calgary, pp. 221-231	
FAM		P.G. Teunissen et al., Ambiguity dilution of precision: Definition, Properties and Application, Proceedings of the ION GPS-97, 16-19 September 1997, Kansas City, USA, pp. 891-899	
FAM FAM Frim		P. Teunissen, The GPS integer least-squares statistics, Phys. Chem. Earth, 25(A9-A11), 673-677	
(mr		P. Teunissen, Statistical GNSS Carrier Phase Ambguity Resolution: A Review, IEEE Workshop on Statistical Signal Processing Proceedings 2001 (9 pages)	

Examiner	Date	
Signature	Considered	

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw time through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

1 Applicant's unique citation designation number (optional). 2 Applicant is to place a check mark here if English language Translation is estached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed desplication form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO:

PTO/SB/088 (08-03)
Approved for use through 07/31/2006. OM8 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Substitute for form 1449/				n of information unless it contains a valid OMB control number. Complete if Known
			Application Number	10/696,528
INFORMATION DISCLOSURE			Filing Date	28 October 2003
STATEMENT BY APPLICANT		First Named Inventor	Ulrich VOLLATH	
(Use as many sheets as necessary)		Art Unit	2655	
		Examiner Name		
Sheet 5	of	5	Attorney Docket Number	A-1403

Examiner Initials*	Cite No.1	NON PATENT LITERATURE DOCUMENTS Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	Τ²
(yr		P. Teunissen, The success rate and precision of GPS ambiguities, J. Geod., 74(3/4), 2000, pp. 321-326	
CHW CHW		U. Vollath et al., Analysis of Three-Carrier Ambiguity Resolution (TCAR) Technique for Precise Relative Positioning in GNSS-2, Proceedings of the ION-GPS 1998, Nashville, September 15-18, The Institute of Navigation, Alexandria, VA, pp. 417-425	
KHM		U. Vollath et al., Ambiguity Resolution using Three Carriers, Performance Analysis using "Real" Data, Proceedings of the GNSS-2001 conference, Seville, May 2001, pp.	
Sur		U. Vollath et al., Network RTK Versus Single Base RTK - Understanding the Error Characteristics, Proceedings of the GNSS-2002 Conference, May 2002, pp. 2774-2780	
		U. Vollath, Decentralized Floating Solution in Trimble Total Control 2.7. Trimble Terrasat GmbH Internal Report, Issue 1, Revision 1, unpublished (7 pages)	
<×>/~		J. Wang et al., A discrimination test procedure for ambiguity resolution on- the-fly, Journal of Geodesy (1998) 72, pp. 644-653	
Exh.		"Trimble Total Control Software" Technical Notes, Product Brochure of Trimble Navigation Limited, 05/02 (8 pages)	

Examiner	Date
Claustin	Date
Signature	Considered
	Considered
PEYA LANDER D. A-Mark M	

^{*}EXAMINER: Initial if reference considered, whether or not distion is in conformance with MPEP 609. Draw tine through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

1 Applicant's unique citation designation number (optional). 2 Applicant is to place a check mark here it English language Translation is ettached. This collection of information is required by 37 CFR 1.98. The Information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: